STATEMENT OF BASIS

Air Quality Construction Permit

3M Company
Brookings, South Dakota

South Dakota Department of Environment and Natural Resources

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1.0 Operational Description

1.1 Existing Operations

The 3M Company manufactures a variety of medical devices and surgical products at its facility in Brookings, South Dakota. The primary Standard Industrial Classification code is 2672 – Coated and Laminated Paper, Not Elsewhere Classified and the secondary SIC code is 3089 – Plastics Products, Not Elsewhere Classified.

The 3M Company's Title V air quality operating permit was renewed on September 9, 2011. Table 1-1 provides a description of the units and processes covered under the 3M Company's existing Title V air quality operating permit.

Table 1-1 – Description of Permitted Units, Operations, and Processes

Unit	Description	Maximum Operating Rate	Control Device
#3	Boiler #3 – 1979 Trane Murray steam boiler. The boiler itself does not have any fuel fired burners. Heat is provided by the exhaust gases from the regenerative thermal oxidizer.	Not applicable	Not applicable
#4a	M1 coating line – 1975 custom built coating line with two coating stations operated in parallel. The two coating stations will not operate simultaneously.	Web throughput of 127 square meters per minute	Regenerative Thermal Oxidizer (Unit #4f)
#4b	M2 coating line – 1975 custom built coating line with two coating stations operated in parallel. The two coating stations will not operate simultaneously.	Web throughput is 187 square meters per minute	
#4c	M3 coating line – 1975 custom built coating line with two coating stations operated in parallel. The two coating stations will not operate simultaneously.	Web throughput is 330 square meters per minute	
#4d	M4 coating line and drum enclosure – 1994 custom built coating line and drum enclosure.	Web throughput is 198 square meters per minute	
#4e	M6 coating line – 2006 custom built coating line.	Web throughput is 198 square meters per minute	

Unit	Description	Maximum Operating Rate	Control Device
#4f	2004 regenerative thermal oxidizer. The regenerative thermal oxidizer is fired by the exhaust gases from the coating lines and natural gas. The exhaust gases from the regenerative thermal oxidizer may be routed to Boiler #3 or its own stack.	Burner #1 – 32 million Btus per hour heat input	Not applicable
#7	Mixing room consisting of various drums, totes, and mixers used to mix or blend solvents and adhesives before being applied by the coaters.	Not applicable	Not Applicable
#8	Die cleaning room used to clean parts with solvents.	Not applicable	Not Applicable
#9a	1990 Una-Dyn silo used to store polyethylene and polypropylene resin pellets.	Storage capacity is 7,200 cubic feet and can be loaded at 2,800 pounds per hour	1990 Donaldson dust filter
#9b	1990 Una-Dyn silo used to store polyethylene and polypropylene resin pellets.	Storage capacity is 7,200 cubic feet and can be loaded at 2,800 pounds per hour	1990 Donaldson dust filter
#9c	1990 Una-Dyn silo used to store polyethylene and polypropylene resin pellets.	Storage capacity is 7,200 cubic feet and can be loaded at 2,800 pounds per hour	1990 Donaldson dust filter
#9d	1990 Una-Dyn silo used to store polyethylene and polypropylene resin pellets.	Storage capacity is 7,200 cubic feet and can be loaded at 2,800 pounds per hour	1990 Donaldson dust filter
#10a	Transfer of polyethylene or polypropylene resin pellets from the silos to the extruder area.	2,800 pounds per hour per silo	1990 Una-Dyn baghouse
#10b	Transfer of polyethylene or polypropylene resin pellets from the silos to the extruder area.	2,800 pounds per hour per silo	1990 Una-Dyn baghouse
#10c	Transfer of polyethylene or polypropylene resin pellets from the silos to the extruder area.	2,800 pounds per hour per silo	1990 Una-Dyn baghouse
#11a	Oven on the 4K maker line fired with natural gas.	4.5 million Btus per hour heat input	Not applicable
#11b	Oven on the 4K maker line fired with natural gas.	4.5 million Btus per hour heat input	Not applicable

Unit	Description	Maximum Operating Rate	Control Device
#13a	The 1735 film lab uses ethylene oxide to sterilize health care products.	Not applicable	Donaldson catalytic ethylene oxide abator.
#13b	The 1742 film lab uses ethylene oxide to sterilize health care products.	Not applicable	Not applicable
#14a	Tanks 12-A-7 – 1992 Clauson Tank Company aboveground tank used to store flammable adhesives.	15,000 gallons	Located inside a building
#14b	Tanks 12-A-8 – 1992 Clauson Tank Company aboveground tank used to store flammable adhesives.	15,000 gallons	Located inside a building
#14c	Tanks 12-A-9 – 1992 Clauson Tank Company aboveground tank used to store flammable adhesives.	15,000 gallons	Located inside a building
#17	24J extrusion process with hot melt coater – 2001 Davis Standard Corporation, model no. D-TEX-58, extruder.	1,905 tons of adhesive per year	Not applicable
#18	22J solventless coater – 1993 Davis Standard Corporation, model #60IN60TPTH, coater, with a natural gas flame treater.	2,100 pounds per hour of resin and 600 pounds per hour of adhesive. The flame treater has a maximum capacity of 0.18 million Btus per hour heat input.	Not applicable
#19	21J extrusion process – 1974 NRM, model Pacemaker III, extruder.	1,995 pounds of resin pellets per hour	Not applicable
#20	4K maker line – 1971 custom built process for coating non-woven webs.	Not applicable	Not applicable
#21	5K maker line – 1971 custom built process for coating non-woven webs.	Not applicable	Not applicable
#22	6K maker line – 1971 custom built process for coating non-woven webs.	Not applicable	Not applicable
#24	Three industrial cooling towers.	Not applicable	Not applicable
#25	Diesel Generator #2 – 2007 Detroit Diesel Series 60 limited use generator fueled with distillate oil.	635 horsepower or 400 kilowatts	Not applicable

Unit	Description	Maximum Operating Rate	Control Device
#27	Diesel Generator #1 – 1996 Ziegler/Caterpillar diesel generator, model # 3406, fueled with distillate oil.	587 horsepower or 400 kilowatts	Not applicable
#28	Boiler #4 – 2000 Johnston, model PFTA 1000-4 steam boiler, fired with natural gas or distillate oil. The boiler is equipped with low NOx burners.	33.5 million Btus per hour heat input	Not applicable
#29	Boiler #5 – 2000 Johnston, model PFTA 1000-4 steam boiler, fueled with natural gas. The boiler is equipped with low NO_x burners.	33.5 million Btus per hour heat input	Not applicable
#30	Coating Line – 2008 PCT Engineered Systems Membrane Imbibing Station	50 feet per minute (line speed)	Not applicable
#31	Diesel Generator #3 – 2011 MTU Detroit, model #DS300D6S, nonemergency generator fueled with diesel.	343 kilowatts or 460 brake horsepower	Not applicable

1.2 Proposed Revision

3M Company submitted an application to install a new corona treater on May 14, 2012. The proposed corona treater will be added to existing permitted source Unit #19 (21J extrusion process). Emissions from the corona treater will be emitted through the stack associated with the 21J extrusion process. 3M is requesting that the Title V air quality operating permit be modified at the same time as the air quality construction permit is being issued.

2.0 New Source Performance Standards

DENR reviewed the new source performance standards under 40 CFR Part 60 and determined that there are no New Source Performance Standards that are applicable to the corona treater.

3.0 New Source Review

ARSD 74:36:10:01 states New Source Review regulations apply to areas of the state which are designated as nonattainment pursuant to the Clean Air Act for any pollutant regulated under the Clean Air Act. 3M Company's facility is located in Brookings, South Dakota, which is in attainment or unclassifiable for all the pollutants regulated under the Clean Air Act. Therefore, 3M Company is not subject to New Source Review.

4.0 Prevention of Significant Deterioration

A prevention of significant deterioration (PSD) review applies to new major stationary sources and major modifications to existing major stationary sources in areas designated as attainment under Section 107 of the Clean Air Act for any regulated air pollutant. The following is a list of regulated air pollutants under the PSD program:

1. Total suspended particulate (PM);
2. Particulate with a diameter less than or equal to 10 microns (PM10);
3. Particulate with a diameter less than or equal to 2.5 microns (PM2.5);
4. Sulfur dioxide (SO_2);
5. Nitrogen oxides (NOx);
6. Carbon monoxide (CO);
7. Ozone – measured as volatile organic compounds (VOCs);
8. Lead;
9. Fluorides
10. Sulfuric acid mist;
11. Hydrogen sulfide;
12. Reduced sulfur compounds;
13. Total reduced sulfur; and
14. Greenhouse gases (carbon dioxide, methane, nitrous oxide, etc.).

If the source is considered one of the 28 named PSD source categories listed in Section 169 of the federal Clean Air Act, the major source threshold is 100 tons per year of any regulated pollutant, except for greenhouse gases. The major source threshold for all other sources is 250 tons per year of any regulated pollutant, except for greenhouse gases.

The major source threshold for greenhouse gases is listed below:

1. New PSD source because of a criteria air pollutant, the major source threshold for greenhouse gases is 75,000 tons per year of carbon dioxide equivalent or more;
2. New PSD source if greenhouse gas emissions are 100,000 tons per year of carbon dioxide equivalent or more;
3. For an existing PSD source because of a criteria air pollutant, a major modification for greenhouse gases is an increase of 75,000 tons per year of carbon dioxide equivalent or more;
4. For an existing non-PSD source that has the potential to emit 100,000 tons per year of carbon dioxide equivalent emissions or more, a major modification for greenhouse gases is an increase of 75,000 tons per year of carbon dioxide equivalent or more; and
5. In addition to subsection (2) and (4), a specific greenhouse gas, without calculating the carbon dioxide equivalent, also needs to emit greater than 100 or 250 tons per year, whichever is applicable, to be regulated.

4.1 Background

3M Company was issued a prevention of significant deterioration (PSD) preconstruction permit

(#28.3301-PSD) on June 6, 2006, to install and operate the M6 coating line (Unit #4e). 3M Company was issued a PSD permit because the potential volatile organic compound (VOC) emissions from the M6 coating line are greater than the PSD threshold of 40 tons per year as a major modification to a an existing facility. 3M Company accepted operational limits in the PSD permit to avoid a PSD review for sulfur dioxide and nitrogen oxides.

In 2009, 3M Company made several modifications at the Brookings plant, which included installing a new membrane imbibing process, replacing boilers, and eliminating residual oil and used oil as a boiler fuel. Also, 3M Company did not construct the second thermal oxidizer. With the changes, operational limits were no longer required to avoid PSD for sulfur dioxide and nitrogen oxides. Therefore, DENR rescinded the permit conditions that were associated with the operational limits for sulfur dioxide in permit #28.3301-PSD in the Title V air quality operating permit issued September 29, 2009.

4.2 Potential emission calculations

The department uses stack test results to determine air emissions whenever stack test data is available from the source or a similar source. When stack test results are not available, the department relies on manufacturing data, material balance, EPA's Compilation of Air Pollutant Emission Factors (AP-42, Fifth Edition, Volume 1), information submitted in the application, or other methods to determine potential air emissions. Potential emissions for each applicable pollutant are calculated by assuming the unit operates every day of the year at the maximum design capacity.

The maximum design capacity of the corona treater is 10 kilowatts. In the application, 3M submitted a manufacturer determined volatile organic emission rate of 0.072 pounds per kilowatt-hour for the corona treater. This emission rate reflects the highest ozone production rate observed during various trials and production conditions. The potential VOC emissions are calculated using Equation 4-1.

Equation 4-1 – Potential volatile organic compound emissions

$$\text{Potential Emissions}\,\frac{\text{tons}}{\text{year}} = 0.072\,\frac{\text{pounds VOC}}{\text{hour-kW}} \times 10\ \text{kW} \times 8{,}760\,\frac{\text{hours}}{\text{year}} \div 2{,}000\,\frac{\text{pounds}}{\text{ton}} = 3.15\ \text{tons/year}$$

There is no control equipment associated with the corona treater. Therefore, the potential uncontrolled emissions are equal to the potential controlled emissions and will be referred to as potential emissions.

The significant thresholds for determining whether a proposed change is a major modification subject to the PSD program are identified in 40 CFR §52.21 and displayed Table 4-1. As shown in the table, the proposed addition of a corona treater is not considered a major modification and is not subject to the PSD program.

Table 4-1 – Potential Emissions from Corona Treater

Pollutant	Potential Emissions	Significant Threshold	Subject to PSD
Particulate matter	0.0 tons per year	25 tons per year (TSP)	No
		15 tons per year (PM10)	No
		10 tons per year (PM2.5)	No
Sulfur dioxide	0.0 tons per year	40 tons per year	No
Nitrogen oxide	0.0 tons per year	40 tons per year	No
Carbon monoxide	0.0 tons per year	100 tons per year	No
Volatile organic compounds	3.2 tons per year	40 tons per year	No
Carbon dioxide	0.0 tons per year	75,000 tons per year	No

5.0 National Emission Standards for Hazardous Air Pollutants

DENR reviewed the national emission standards for hazardous air pollutants under 40 CFR Part 61 and determined there are no applicable requirements associated with the corona treater.

6.0 Maximum Achievable Control Technology Standard

3M Company is considered a major source of hazardous air pollutants. DENR reviewed the maximum achievable control technology standards under 40 CFR Part 63 and determined that there are no applicable requirements associated with the corona treater.

7.0 Other Requirements

7.1 State Emission Limits

The corona treater operates on supplied electricity. Therefore, it is not subject to the state's particulate or sulfur dioxide emission limits. However, each permitted unit is required to meet the 20 percent opacity limit as required in ARSD 74:36:12:01.

7.2 Compliance Assurance Monitoring

Compliance assurance monitoring is applicable to permit applications received on or after April 20, 1998, from major sources applying for a Title V air quality permit. Compliance assurance monitoring is applicable to any unit that meets the following criteria:

1. The unit is subject to an emission limit or standard for the applicable regulated air pollutant;
2. The unit uses a control device to achieve compliance with any such emission limit or standard; and
3. The unit has potential emissions prior to the control device of the applicable regulated air pollutant that are equal to or greater than 100 percent of the amount, in tons per year, required for a source to be classified as a major source.

3M Company submitted its permit application after April 20, 1998. The corona treater does not meet all three criteria above and therefore is not subject to compliance assurance monitoring.

7.3 Periodic Monitoring

Periodic monitoring is required for each emission unit that is subject to an applicable requirement at a source subject to Title V of the Federal Clean Air Act. Units subject to opacity limits will be based on periodic visible emission readings

8.0 Recommendation

In accordance with ARSD 74:36:20:02, the owner or operator may not modify its existing source until a construction permit has been issued, unless it meets the requirements under ARSD 74:36:20:02.01. In accordance with ARSD 74:36:20:02.01, the owner or operator may construct prior to issuance of a construction permit if it meets all seven requirements in that section but may not operate any unit that emits an air pollutant until the construction permit is issued. 3M Company is required to obtain an air quality construction permit for the installation of the corona treater and has met the requirements in ARSD 74:36:20:02.01. Therefore, 3M Company may construct the corona treater while DENR is in the process of issuing a construction permit. 3M Company will be required to construct and operate the corona treater within the requirements stipulated in the following regulations:

- ARSD 74:36:12 – Control of Visible Emissions; and
- ARSD 74:36:20 – Construction Permits for New Sources or Modifications.

DENR has agreed to modify the 3M Company's Title V air quality operating permit at the same time as it processes the air quality construction permit application. The draft changes to the existing Title V air quality operating permit are displayed in Appendix A.

Based on the information submitted in the air quality permit application, DENR recommends conditional approval of an air quality construction permit for the corona treater and a modification to the existing Title V air quality operating permit for 3M Company in Brookings, South Dakota. Questions regarding this permit review should be directed to Marlys Heidt, Engineer III.

Appendix A
Modification

The following changes to the existing permit represent changes that meet the definition of a modification. Additions to the existing permit are represented in blue, bold, and underline and deletions are represented in red with overstrikes. In the case where permit conditions are deleted or added between permit conditions, the permit conditions will be renumbered appropriately when the permit is issued.

1.0 STANDARD CONDITIONS

1.1 Operation of source

In accordance with Administrative Rules of South Dakota (ARSD) 74:36:05:16.01(8), the owner or operator shall operate the units, controls, and processes as described in Table 1-1 in accordance with the statements, representations, and supporting data contained in the complete permit application received November 2, 2010**,** ~~and~~ September 27, 2011**, and May 14, 2012,** unless modified by the conditions of this permit. Except as otherwise provided herein, the control equipment shall be operated in a manner that achieves compliance with the conditions of this permit at all times. The application consists of the application forms, supporting data, and supplementary correspondence. If the owner or operator becomes aware that it failed to submit any relevant facts in a permit application or submitted incorrect information in an application, such information shall be promptly submitted.

Table 1-1 – Description of Permitted Units, Operations, and Processes

Unit	Description	Maximum Operating Rate	Control Device
#3	Boiler #3 – 1979 Trane Murray steam boiler. The boiler itself does not have any fuel fired burners. Heat is provided by the exhaust gases from the regenerative thermal oxidizer.	Not applicable	Not applicable
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#10a	Transfer of polyethylene or polypropylene resin pellets from the silos to the extruder area.	2,800 pounds per hour per silo	1990 Una-Dyn baghouse

Unit	Description	Maximum Operating Rate	Control Device
#10b	Transfer of polyethylene or polypropylene resin pellets from the silos to the extruder area.	2,800 pounds per hour per silo	1990 Una-Dyn baghouse
#10c	Transfer of polyethylene or polypropylene resin pellets from the silos to the extruder area.	2,800 pounds per hour per silo	1990 Una-Dyn baghouse
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#30	Coating Line – 2008 PCT Engineered Systems Membrane Imbibing Station	50 feet per minute (line speed)	Not applicable
#31	Diesel Generator #3 – 2011 MTU Detroit, model #DS300D6S, nonemergency generator fueled with diesel.	343 kilowatts or 460 brake horsepower	Not applicable
#32	**2012 Pillar Technologies corona treater located on the 21 J extrusion process.**	**10 kilowatts**	**Not applicable**